

“The Impact of Covid-19 on the Pharmaceutical Industry of Pakistan; An analysis of the variation in the share prices pre and post Covid”



By:

Muhammad Sameed Laeeq

01-111192-085

Hamza Nadeem Janjua

01-111192-031

Siraj Haider

01-111192-266

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Supervisor:

Abdullah Hafeez

Department of Business Studies

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Names of Student(s):

- *Muhammad Sameed Laeeq* 01-111192-085
- *Hamza Nadeem Janjua* 01-111192-031
- *Siraj Haider* 01-111192-266

Class: Spring 2023

Approved by:

Abdullah Hafeez

Supervisor

Umer Chaudhry

Internal Examiner

Cdr Jaffer

External Examiner

Dr.Syed Haider Ali Shah

Research Coordinator

Dr.Khalil Ullah Mohammad

Head of Department

Business Studies

Abstract

The project "Impact of Covid-19 on the pharmaceutical industry of Pakistan; an analysis of the variation in the share prices before and after Covid-19" seeks to learn more about the effects of the worldwide pandemic on Pakistan's pharmaceutical sector while concentrating on share price changes. In order to establish a direct correlation between these variables, this project investigates the relationship between key financial indicators, such as net profit margin, earnings per share, and current ratio, and share price returns.

In order to meet the project's goals, a thorough analysis of Pakistan's pharmaceutical sector was carried out, looking at share price changes of a few chosen companies before and after the Covid-19 pandemic. Data on the pre- and post-pandemic periods' pre-pandemic net profit margins, earnings per share, current ratios, and share price returns were gathered for a given time frame.

To determine the strength and direction of the relationships between Net profit margin, earnings per share, current ratio, and share price returns, the study used statistical techniques like regression analysis. The project's analysis of the data sought to find any appreciable relationships between these financial indicators and share price increases, highlighting the effect of Covid-19 on the pharmaceutical sector.

The results of this study will help us comprehend the dynamics of Pakistan's pharmaceutical sector more fully during the Covid-19 pandemic. The project will also provide important insights for investors, industry stakeholders, and policymakers regarding the connection between financial performance indicators and share price returns

This project aims to show the impact of financial performance on the valuation of pharmaceutical companies in Pakistan by establishing a direct correlation between net profit margin, earnings per share, current ratio, and share price returns. The findings will serve as a foundation for upcoming pharmaceutical industry research and decision-making procedures, assisting stakeholders in navigating the difficulties presented by the ongoing pandemic and other market uncertainties.

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We would like to appreciate the support of our family and friends, who assisted us, and prayed for us to successfully complete our project. We hope that this project helps us to learn and enhance our academic knowledge and skills

Dedication

The Final Year Project undertaken by us and the completion of this project could not have been possible without the participation and assistance of so many people whose names may not all be mentioned here. Their contribution is sincerely appreciated and gratefully acknowledged.

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1. Introduction

1.1 Background

The industrial sector in Pakistan experienced significant difficulties and disruptions during the Covid-19 pandemic. Due to the implementation of lockdown measures and supply chain disruptions, a number of industries saw a decrease in production and operational challenges (Malik, 2020).

The pandemic had a significant negative impact on Pakistan's manufacturing sector, which is an important part of its industrial landscape. Due to the lockdown restrictions and a drop in demand for non-essential goods, many factories were forced to shut down or operate at reduced capacity (Sajid & Latif, 2020).

One of Pakistan's largest industrial sectors, the textile and clothing sector, also experienced significant setbacks. The demand for textiles and clothing fell precipitously as a result of international trade restrictions and global lockdowns. Numerous orders were postponed or cancelled, which resulted in budgetary losses and job losses (Ghauri, 2020).

An additional slowdown was seen in the construction sector, which had previously made a significant contribution to Pakistan's economic expansion. Temporary suspension of construction activities had an impact on ongoing projects and led to job losses in the industry (Khan, 2020).

It is important to note, though, that some industries responded to the pandemic's challenges with resiliency. For example, the demand for necessary medications and medical supplies increased in the pharmaceutical industry. To meet the growing demand, many pharmaceutical companies increased production, and they were instrumental in the nation's healthcare response (Dawn, 2020).

The Pakistani government introduced a number of relief measures and stimulus packages to support businesses in response to the industrial challenges brought on by the pandemic. These actions included financial aid, tax incentives, and the creation of funds to offer assistance to impacted industries (Dawn, 2020).

Pharmaceutical companies are businesses engaged in the discovery, production, and distribution of pharmaceutical products. They contribute significantly to the healthcare sector by developing cutting-edge medications that treat illnesses and enhance people's general health and wellbeing. Pharmaceutical firms conduct business in Pakistan under the legal parameters established by the Drug Regulatory Authority of Pakistan (DRAP), ensuring the public's access to safe, effective, and high-quality medications. (Correspondents, 2018)

Pharmaceutical businesses in Pakistan include both international conglomerates and regional producers. To find and create new medicines, these businesses spend a lot of money on research and development (R&D). Teams of scientists, researchers, and medical experts are employed by these companies to find prospective therapeutic targets, carry out preclinical research, and advance to human clinical trials. Clinical trials produce information on the efficacy and safety of the medications, which is then submitted to the DRAP for regulatory approval. (Correspondents, 2018)

A pharmaceutical company can produce and distribute a medicine after receiving regulatory permission. To achieve quality control and satisfy international standards, manufacturing facilities in Pakistan must follow Good Manufacturing Practices (GMP) rules. The pharmaceutical businesses are in charge of making sure that their production procedures meet the necessary requirements and result in safe and efficient pharmaceuticals.

To make their products available to healthcare professionals and patients, pharmaceutical businesses in Pakistan also prioritize marketing and distribution. To advertise their medications to medical experts and cultivate connections with hospitals, clinics, and pharmacies, they engage sales and marketing teams. The businesses collaborate extensively with the healthcare system to inform doctors about the advantages and application of their medications. (Malik, 2020).

In recent years, the pharmaceutical sector in Pakistan has placed a strong emphasis on research and development. The government has encouraged regional businesses to invest in R&D and innovation through the Ministry of Science and Technology and other organizations. This strategy intends to lessen the nation's dependency on imported medications and increase the ability of domestic pharmaceutical businesses to develop unique pharmaceuticals.

The pharmaceutical sector in Pakistan has been continuously expanding, according to the Pakistan Pharmaceutical Manufacturers Association (PPMA). More than 800 pharmaceutical businesses that are active in the nation are represented by the PPMA. They have been crucial in helping the general public get inexpensive medications. (PPMA, 2021)

1.2 Covid-19 Pandemic Overview

This section describes the Covid-19 pandemic, which was brought on by the brand-new coronavirus SARS-CoV-2 and which has had a profound effect on social structures, economy, and public health worldwide. To better comprehend the significance of our study in relation to the impact of the pandemic on the pharmaceutical businesses of Pakistan, it is vital to have a general understanding of the global pandemic. (WHO, 2020)

The virus, which was first discovered in Wuhan, China in December 2019, soon spread over the world and caused a health crisis. This page gives a comprehensive description of the COVID-19 pandemic, covering its causes, spread, effects on public health, and international reaction.

It is thought that a seafood market in Wuhan where live animals were sold is where the COVID-19 virus first emerged. When an infected person coughs, sneezes, or talks, respiratory droplets are the main way that the virus spreads. According to the World Health Organization [WHO], 2020a, it can also spread by contacting surfaces that have been exposed to the virus before touching the face, mouth, or eyes. (WHO, 2020)

Public health has been significantly impacted by the COVID-19 epidemic. Acute respiratory distress syndrome (ARDS) and severe pneumonia are just two of the symptoms that the virus can cause. Serious sickness and mortality are more likely to affect the elderly and people with underlying medical disorders (WHO, 2020).

Worldwide, the epidemic has overrun healthcare systems, creating a scarcity of medical staff, hospital beds, and equipment. The rapid spread of the virus and the enormous demand for medical resources have made it difficult to treat all those who need it (Guan et al., 2020).

Countries all across the world have put various plans in place to stop the COVID-19 pandemic's spread and lessen its effects. Numerous testing, contact tracking, quarantine measures, social seclusion, and the promotion of good hygiene practises are some of these tactics (WHO, 2020).

Additionally, governments and medical institutions have sought to hasten the production and dissemination of COVID-19 vaccines. The introduction of vaccines has been helpful in lessening the severity of the illness, avoiding hospitalisations, and saving lives (Polack et al., 2020).

The COVID-19 epidemic has had a significant impact on society and the economy. Global supply chains have been interrupted by lockdowns and travel restrictions implemented to stop the virus's spread, which has resulted in economic downturns and job losses. Travel, tourism, hospitality, and retail are just a few of the industries that have been negatively impacted (McKibbin & Fernando, 2020).

Millions of kids around the world have been affected by school closings as a result of the pandemic's social effects on schooling. Due to the isolation, worry, and dread that has resulted, there are now more issues with mental health. The epidemic has disproportionately affected vulnerable groups, such as the elderly, the poor, and marginalised communities (Brooks et al., 2020).

The introduction of additional virus strains has added to the complexity of the COVID-19 pandemic. These variants, like the Delta variant, have demonstrated greater transmissibility, which may cause a rise in cases in some areas. Inequities in vaccine delivery, vaccine resistance, and the requirement for ongoing surveillance and monitoring to stop the spread of the virus are ongoing difficulties (WHO, 2021).

Global health, economics, and communities have all suffered significantly as a result of the COVID-19 pandemic. Global public health systems have faced considerable obstacles as a result of the virus's origin and its spread. To stop the virus's spread and lessen its effects, governments, medical institutions, and researchers have reacted with a variety of techniques, including testing, vaccine, and public health initiatives. But the pandemic still poses persistent problems, underscoring the necessity of international cooperation, equal access to healthcare resources, and persistent efforts to stop and deal with upcoming infectious disease epidemics.

1.3 Role of pharmaceutical companies during Covid-19 pandemic

Pharmaceutical firms in Pakistan have proven their adaptability, endurance, and dedication to assuring the accessibility of important medications, assisting medical professionals, and helping the country's pandemic response. The role that pharmaceutical corporations played during the COVID-19 epidemic in Pakistan is thoroughly discussed in this part, with special emphasis on their efforts in the areas of drug manufacture, research and development, collaboration, and community involvement. (The News, 2021)

Pakistani pharmaceutical firms responded quickly to the pandemic's increasing demand for vital medications. To assure the accessibility of essential medications including antivirals, antibiotics, and respiratory treatments, they increased their production capacities (Ali, Shah, & Hasan, 2020). These businesses collaborated closely with regulatory bodies to hasten the licensing and registration procedures for COVID-19-related medications, providing patients with prompt access to treatments (The News, 2021).

Additionally, the stability of the drug supply chain was significantly aided in Pakistan by the pharmaceutical industry. By diversifying their sources of supply and working with regional vendors, they overcame obstacles such interruptions in the worldwide supply of raw materials and active pharmaceutical ingredients (APIs) (Khan et al., 2020). This guaranteed a steady supply of medications to hospitals across the nation.

The COVID-19 epidemic triggered a flurry of R&D initiatives in Pakistan's pharmaceutical industry. Pharmaceutical firms actively participated in clinical trials to investigate COVID-19 therapies and vaccinations. To hasten the development of efficient treatments, they worked together with research institutions, healthcare facilities, and foreign partners (Bhutta, 2020).

By taking part in international clinical trials and working with international pharmaceutical organizations, these businesses also supported international initiatives. Their participation in

R&D projects revealed their dedication to increasing scientific understanding and identifying countermeasures to the epidemic (The News, 2021).

Pakistani pharmaceutical firms actively participated in alliances and cooperation to strengthen the country's response to COVID-19. They partnered with governmental organizations, regulatory authorities, and healthcare providers to exchange knowledge, skills, and resources. These partnerships sought to address issues such drug distribution, availability, and regulatory approvals (The News, 2021).

Additionally, pharmaceutical firms collaborated with international bodies like the World Health Organization (WHO) in order to support global projects and gain access to technical support and information exchange. Such partnerships promoted innovation, sped up the pandemic response, and assured compliance with global best practises (Khan et al., 2020).

Pharmaceutical firms in Pakistan understood the value of community involvement and actively participated in promoting COVID-19 vaccine, treatment, and prevention. They partnered with healthcare providers and neighbourhood groups, started awareness initiatives, and distributed information via a variety of media (Business Recorder, 2020). These programmes had two goals: to advance public health and counteract false information about the epidemic.

Additionally, pharmaceutical firms helped disadvantaged areas by sending medicines, PPE, and other medical supplies. In order to provide healthcare services to marginalised populations, they also made contributions to relief funds and worked closely with hospitals and non-governmental organizations (Pakistan Observer, 2020).

The Pakistani healthcare industry faced hitherto unprecedented challenges as a result of the COVID-19 outbreak. However, the nation's pharmaceutical firms rose to the challenge, showcasing resiliency, creativity, and a dedication to public health. These businesses were instrumental in meeting the population's healthcare demands during this crisis by their work in drug manufacture and supply, research and development, collaboration, and community participation. (Pakistan Observer, 2020).

They have made a substantial contribution to the national response to COVID-19 by their work assuring the supply of critical medications, conducting research, working with stakeholders, and increasing awareness. It is essential to acknowledge and encourage the contribution made by pharmaceutical firms to creating a robust healthcare system and putting together plans for potential healthcare catastrophes (Business Recorder, 2020).

Three well-known pharmaceutical companies in Pakistan, GlaxoSmithKline (GSK), Abbott Pakistan, and Sanofi Aventis, have shown their dedication to public health by actively aiding in the fight against COVID-19.

Pharmaceutical firms have made a substantial contribution to the nation's reaction to COVID-19 by assisting healthcare systems and meeting the population's changing healthcare demands. They have made significant contributions to drug manufacture research and development, collaboration, and community support, which have significantly lessened the pandemic's effects in Pakistan.

1.4 Performance of Pharmaceutical companies

The pharmaceutical industry has played a crucial role in combating the COVID-19 pandemic through the development and distribution of vaccines, therapies, and other medical supplies. While the pandemic brought unprecedented challenges, it also created opportunities for pharmaceutical companies to innovate and collaborate with governments and regulatory

bodies. The increased demand for COVID-19 treatments, vaccines, and personal protective equipment (PPE) significantly impacted the financial performance of pharmaceutical companies.

The financial performance of pharmaceutical companies during the COVID-19 pandemic differed based on several factors, including their existing product portfolio, research and development capabilities, and manufacturing capacities. While some businesses saw a spike in sales as a result of the strong demand for COVID-19-related products, other businesses encountered difficulties as a result of delays in supply chains, clinical trials, and regulatory procedures. Pharmaceutical companies' R&D costs rose as a result of the epidemic as they rushed to provide vaccinations and treatments (Simply Wall, 2023).

During the COVID-19 epidemic, the stock prices of pharmaceutical companies saw large fluctuations. Stock markets first saw a dramatic decrease as the extent of the epidemic became clear; pharmaceutical firms were not exempt from this downward trend. Investor confidence started to recover, though, as the pharmaceutical industry quickly developed a vaccine and other responses to the disaster. Positive news regarding vaccination studies and emergency use authorizations caused the stock values of many pharmaceutical companies to leap to new heights (Simply Wall, 2023).

During the pandemic, a number of variables affected the stock values of pharmaceutical businesses. First off, how well vaccine development and clinical trials are going has a big impact on investor sentiment. Stock prices frequently rose significantly after positive news was announced, such as the results of vaccine studies that were effective or regulatory approvals. Stock prices, on the other hand, were severely impacted by setbacks or delays in vaccine development (Simply Wall, 2023).

Second, stock prices were impacted by investor perceptions of a company's capacity to meet the spike in demand for pharmaceutical items during the epidemic. Positive trends in stock price were produced by companies with strong manufacturing capacities, varied product portfolios, and powerful supply chain networks (Simply Wall, 2023).

Thirdly, there was a major impact of government contracts and policies on stock prices. Due to the possibility for huge income and long-term stability, pharmaceutical businesses that

successfully obtained significant government contracts for the sale of vaccines or therapeutic goods frequently saw a significant gain in stock prices (Simply Wall, 2023).

1.5 Company profiles

The three major pharmaceutical firms **GlaxoSmithKline, Abbott Pakistan, and Sanofi Aventis** are thoroughly discussed in this section. These businesses have established themselves as major participants in the pharmaceutical industry and have significantly impacted Pakistan's healthcare system. This review tries to give insight on their background, major offerings, R&D initiatives, and influence on Pakistan's healthcare system. These companies will act as a proxy for the pharmaceutical industry for our project. The data collected from the following companies will be used as an example (population) to simulate the financial conditions of the overall pharmaceutical industry in Pakistan

1.5.1 GlaxoSmithKline (GSK)

GlaxoSmithKline (GSK) is a well-known pharmaceutical corporation with a significant local presence in Pakistan. GSK began operating in the nation in 1959 when it built its first production facility. GSK has grown to be one of Pakistan's biggest pharmaceutical firms over the years and is renowned for its dedication to high standards of quality, inventiveness, and patient-centered healthcare solutions (GSK Pakistan, n.d.).

GSK provides a wide variety of goods in many therapeutic fields, such as respiratory, medicines, vaccines, and consumer healthcare. Well-known brands in their portfolio include Augmentin, Seretide, and Panadol. GSK places a high priority on research and development, spending a lot of money on finding and creating novel medications to treat unmet medical needs (GSK Pakistan, n.d.).

Through its vaccines segment, GSK has considerably improved public health in Pakistan. The business has produced cutting-edge vaccines to fight ailments like pneumonia, rotavirus, and influenza, shielding the populace from infections that can be avoided (GSK Pakistan, n.d.).

1.5.2 Abbott Pakistan

Abbott Pakistan: Abbott Pakistan is a division of the international healthcare organization Abbott Laboratories. Abbott Pakistan has a long history in the nation dating back more than 70 years, offering a variety of healthcare products including medications, diagnostics, food, and medical equipment.

Abbott Pakistan is well renowned for its dedication to enhancing healthcare results with cutting-edge technologies. The business' pharmaceutical segment provides a broad range of goods in a number of therapeutic fields, including cardiology, gastrointestinal, women's health, and neurology. In the market, names like Brufen, Brilinta, Duphaston, and Prothiaden are well known. (Abbott Pakistan, n.d.).

Abbott Pakistan is a significant player in the diagnostics market, providing a variety of tests and diagnostic tools in addition to medications. The business's nutrition division offers specialised infant, child, and adult nutritional products.

Abbott Pakistan has aggressively supported Pakistan's healthcare needs, including programmes to combat malnutrition, boost access to healthcare services in rural areas, and improve diabetes management (Abbott Pakistan, n.d.).

1.5.3 Sanofi Aventis

The multinational pharmaceutical business Sanofi Aventis has a substantial presence in Pakistan. The business started operating in Pakistan in 1958, and since then, it has established itself as a major force in the pharmaceutical sector. Sanofi Aventis concentrates on creating cutting-edge solutions to address healthcare issues and enhance patient outcomes. (Sanofi Pakistan, n.d.).

Sanofi Aventis offers a comprehensive selection of pharmacological treatments for conditions like diabetes, cardiovascular disease, oncology, and uncommon illnesses. Under well-known names like Taxotere, Lantus, and Clexane, they provide a wide variety of commodities. The company has a significant commitment to research and development, investing in state-of-the-art equipment to locate and make innovative medications.

Sanofi Aventis has taken a leading role in numerous healthcare efforts in Pakistan. In partnership with governmental agencies and nonprofit organizations, the company has developed cutting-edge therapies for the management of diabetes, launched awareness programmes for disease prevention, and supported the development of healthcare infrastructure (Sanofi Pakistan, n.d.).

2. Problem Statement

The Covid-19 pandemic has had a major impact on a number of industries around the world, and the pharmaceutical sector is no exception. By focusing on changes in share prices and ratios of pharmaceutical businesses, this study seeks to investigate and analyze the impact of the Covid-19 pandemic on the Pakistani pharmaceutical sector. The major players in our study includes the top drug companies of Pakistan.

2.1 Significance of the Study

For a number of stakeholders, including investors, lawmakers, and industry participants, it is imperative to understand the effect of the Covid-19 pandemic on the pharmaceutical industry of Pakistan. This study attempts to offer useful insights into the performance and resiliency of pharmaceutical firms during challenging circumstances by examining the changes in share prices and financial statistics. The findings will not only add to the body of knowledge about the pandemic's effects on the pharmaceutical business, but will also assist investors in making wise choices and policymakers in developing plans to support the industry.

2.2 How did Covid-19 affect the pharmaceutical companies in Pakistan?

The COVID-19 epidemic has had a huge influence on the pharmaceutical industry. Pakistan's pharmaceutical industries faced a variety of challenges and possibilities throughout this time. This section provides a detailed analysis of how the COVID-19 pandemic affected pharmaceutical companies in Pakistan, including changes in demand, supply chain disruptions, regulatory considerations, and opportunities for innovation and growth, in order to gain a deeper understanding of the situation and further assist us in our research.

2.2.1 Increased demand for Essential Medicines

There was an upsurge in demand for common medications such as antibiotics, antivirals, and respiratory aids as a result of the COVID-19 pandemic. As the number of COVID-19 cases increased, hospitals and healthcare facilities need a steady supply of these vital drugs to treat infected patients. Pharmaceutical firms in Pakistan noticed a rise in the production and sales of these essential drugs as a result of the rising demand (Ali, Shah, & Hasan, 2020).

2.2.2 Supply chain disruptions:

The pandemic affected the availability of raw materials, active pharmaceutical ingredients (APIs), and finished medicines by disrupting domestic and international supply chains. The import and export of pharmaceutical goods and ingredients were disrupted by lockdown measures, travel restrictions, and transportation delays. Due to their heavy reliance on imported APIs and raw materials, Pakistani pharmaceutical companies are at risk of supply chain disruptions (Khan et al., 2020). Due to these delays in production and distribution, some drugs were no longer available on the market.

2.2.3 Government Support and Regulatory Considerations

Regulatory agencies in Pakistan implemented initiatives to speed up the licensing and registration procedures for medications and vaccines relevant to COVID-19 during the epidemic. The Drug Regulatory Authority of Pakistan (DRAP) sped up the licensing of necessary medications and made it easier for COVID-19 medications and vaccinations to be imported and produced locally (The News, 2021).

Additionally, the Pakistani government took supporting actions to help out pharmaceutical businesses. To assure the continuation of operations and enable the development of necessary medications, they included tax incentives, subsidies, and loans. Such assistance lessened the financial strain on pharmaceutical firms and inspired them to participate in the pandemic-fighting effort (Pakistan Today, 2020).

2.2.4 Opportunities for Innovation and Growth

The COVID-19 pandemic presented opportunities for pharmaceutical companies in Pakistan to innovate and diversify their product portfolios. Some companies shifted their focus to the production of personal protective equipment (PPE), including masks, gloves, and sanitizers, to meet the growing demand (Business Recorder, 2020). This diversification allowed companies to adapt to changing market needs and contribute to the national response against the pandemic.

The Covid-19 pandemic accelerated the adoption of telemedicine and digital health solutions. Pharmaceutical companies ventured into the development of digital platforms, remote healthcare monitoring devices, and teleconsultation services to support healthcare providers and patients during the crisis (Pakistan Observer, 2020). These innovations opened new avenues for growth and expansion in the healthcare sector.

Pharmaceutical companies conducting clinical trials and research faced difficulties as a result of the epidemic. Movement restrictions and other social isolation strategies hampered new study development and interfered with ongoing clinical trials. Due to patient recruitment difficulties brought on by fear and restricted access to healthcare services, clinical trial sites experienced operational difficulties (Bhutta, 2020). These setbacks prevented the advancement of research and development initiatives, which had an impact on the launch of novel medications and treatments.

Both positive and negative effects of the COVID-19 pandemic were seen by Pakistani pharmaceutical firms. While there were chances for expansion due to the rise in demand for vital medications, problems with supply chains and clinical trials caused difficulties. The availability of necessary medications and the promotion of innovation were both greatly aided by the regulatory backing and government initiatives (Pakistan Observer, 2020).

Pharmaceutical firms in Pakistan have diversified their product lines and used digital health solutions as a response to the shifting market. The pandemic emphasized the need for

strategic planning, strong supply chains, and investments in research and development, underscoring the significance of a resilient and self-sufficient pharmaceutical industry.

The overview of Covid-19's effects on the businesses we've selected for our experiment is given below. We may learn more about the particular issues and tactics used by the companies for our study at this historic time by looking at their operations, product portfolio, and response to the pandemic (Pakistan Observer, 2020).

2.2.5 GlaxoSmithKline (GSK)

The pandemic presented GSK Pakistan with a number of difficulties, including supply chain hiccups, production delays, and restricted access to healthcare facilities for standard medical care (GSK Pakistan, 2020). Sales of vital medications including antivirals and respiratory pharmaceuticals climbed while non-essential product lines saw a dip, as the corporation encountered variations in demand for its products (Sadiq, 2020).

To meet the challenges, GSK Pakistan modified its operations by putting in place stringent safety procedures, making sure that necessary medications were accessible, and assisting medical staff and patients through a number of programmes. In order to spread knowledge about COVID-19 prevention and treatment, the company also worked with authorities and healthcare professionals (GSK Pakistan, 2020).

2.2.6 Abbott Pakistan

For Abbott Pakistan, the COVID-19 pandemic brought both difficulties and opportunity. Due to international constraints on logistics and transportation, the company encountered supply chain disruptions (Abbott Pakistan, 2020). Abbott Pakistan, on the other hand, quickly addressed the problem by maintaining the continuous supply of essential medications and diagnostic tests, particularly for the COVID-19 detection (Siddiqui, 2020).

During the pandemic, Abbott Pakistan also put an emphasis on innovation and teamwork. In order to increase the nation's testing capacity, the business introduced quick diagnostic tests for COVID-19 (Abbott Pakistan, 2020). In order to promote patient care and offer

essential resources, Abbott Pakistan also actively participated in public-private partnerships and interacted with healthcare experts (Abbott Pakistan, 2020).

2.2.7 Sanofi Aventis

Sanofi Aventis faced both difficulties and opportunities as a result of the pandemic. In the company's supply chain, there were hitches that delayed the release of some medications (Sanofi Aventis Pakistan, 2020). Sanofi Aventis, however, quickly took action by increasing manufacturing of necessary drugs and vaccines, particularly those required for the treatment of COVID-19 (Ali, 2020).

During the crisis, Sanofi Aventis also concentrated on assisting medical staff and patients. In addition to donating personal protective equipment (PPE) and engaging in educational programmes to promote COVID-19 prevention and management, the firm offered medical and financial support to healthcare organizations (Sanofi Aventis Pakistan, 2020).

Pharmacies in Pakistan encountered particular difficulties and opportunities as a result of the COVID-19 pandemic. As significant participants in the market, GlaxoSmithKline, Abbott Pakistan, and Sanofi Aventis have responded with dexterity and tenacity. These businesses prioritised the accessibility of necessary medications, modified their business practises to guarantee employee safety, and supported government efforts to combat the epidemic.

These businesses have proven their dedication to helping healthcare professionals and patients through these difficult times, despite supply chain interruptions and changes in demand. GlaxoSmithKline, Abbott Pakistan, and Sanofi Aventis have all made significant contributions to meeting the healthcare needs of Pakistan's people during the COVID-19 epidemic by combining their knowledge, creativity, and cooperative efforts.

3. Design and Implementation

Our project revolves around examining the effects of the Covid-19 pandemic on Pakistan's pharmaceutical industry. The study's initial goal is to examine the impact of the pandemic on the share prices of pharmaceutical companies. Secondly, it looks for important financial ratios that can reveal information about the performance and adaptability of the sector during the pandemic. The study also compares pharmaceutical companies' share prices and financial ratios before and after the Covid-19 outbreak to see if there were any notable changes.

3.1 Purpose of the Project

This project's goal is to analyse how the Covid-19 pandemic has affected Pakistan's pharmaceutical sector. The study specifically compares pharmaceutical company share prices and financial parameters before and after the outbreak. The project aims to accomplish the following goals by doing this analysis:

1. Assess the changes in share prices: The initiative tries to discover any major shifts or trends that may have happened by analysing the share prices of pharmaceutical businesses before and after the Covid-19 outbreak. This investigation will shed light on investor confidence in the pharmaceutical sector during the crisis as well as market sentiment.

2. Evaluate financial ratios in contrast to the Share Prices: To evaluate the performance and financial health of pharmaceutical companies during the pandemic, the study will look at important financial variables such profitability and liquidity. This assessment will help establish whether or not investors' attention to the main financial ratios had any impact on the share prices.

3. Contribute to knowledge and decision-making: The project aims to contribute to the existing literature by providing a comprehensive analysis of the impact of Covid-19 on the

pharmaceutical industry in Pakistan. The findings will aid in the development of strategies by governments to promote and strengthen the industry, the making of informed investment decisions by investors, and the adaptation of business practices by industry participants to meet new difficulties.

By fulfilling these objectives, the project aims to deepen the understanding of the effects of the Covid-19 pandemic on the pharmaceutical industry of Pakistan and generate insights that can inform decision-making and contribute to the resilience and growth of the sector.

3.2 Business model of our companies

Understanding pharmaceutical company business models and operational methods is discussed in this section. For the sake of our study, it is crucial to understand how they approach the research, development, manufacturing, marketing, and distribution of healthcare products. We may learn more about how these businesses function and contribute to Pakistan's healthcare sector by looking at their business models.

3.2.1 GlaxoSmithKline (GSK)

GSK is a business that works in various industries to meet peoples' healthcare requirements. Pharmaceuticals, vaccines, and consumer healthcare make up its three primary segments. Research & development, offering high-quality pharmaceuticals, and successfully managing its worldwide supply chain are all values held by GSK.

GSK spends a lot of time and energy on research and development (R&D), looking for and developing novel therapies. To address unmet medical needs, the company devotes a large amount of resources to its R&D pipeline. Additionally, GSK works in partnership with academic institutions, healthcare providers, and business associates to pool expertise and advance medical research (GSK, 2021).

Another important component of GSK's business strategy is commercial excellence. The business focuses on effectively marketing and promoting its products to consumers, hospitals, and healthcare providers. Strong marketing tactics are used by GSK, including

collaborations with healthcare organizations and doctor education initiatives. Their objective is to guarantee that patients have access to the necessary medications and healthcare solutions.

For GSK, keeping a trustworthy worldwide supply chain is essential. To effectively satisfy market demands, they have a well-established network of production facilities, distribution hubs, and logistics capabilities. To ensure product availability and prompt delivery, GSK places a high priority on supply chain integrity, quality assurance, and regulatory compliance.

3.2.2 Abbott Pakistan

In order to serve a wide range of customer needs, Abbott Pakistan works in several locations. Pharmaceuticals, Diagnostics, Nutrition, and Medical Devices are the four main business areas that the company concentrates on. The innovation, operational excellence, and collaboration are the guiding principles of Abbott Pakistan's business strategy.

At Abbott Pakistan, innovation is crucial. The business makes research and development investments to produce fresh medications, tests, and medical equipment. Identifying unmet medical needs and creating creative solutions to improve patient outcomes are their key goals. In order to benefit from their knowledge and insights, Abbott Pakistan collaborates regularly with academic institutions, healthcare providers, and business leaders.

Abbott Pakistan places a high priority on operational performance. In all areas of operation, the corporation places a strong emphasis on operational effectiveness and quality control. In order to ensure the creation of safe and effective medications, diagnostics, and nutritional products, they must adhere to international norms and recommendations. The production facilities of Abbott Pakistan adhere to Good production Practices (GMP) and are subject to routine audits to ensure compliance and preserve high standards.

At Abbott Pakistan, cooperation is valued highly. The business is committed to forging solid relationships with government agencies, organizations, and healthcare providers in

order to promote cooperation and progress healthcare. Abbott Pakistan wants to create and implement disease management programmes, educational efforts, and awareness campaigns by working with healthcare professionals. Furthermore, Abbott Pakistan actively collaborates with regulatory bodies to ensure compliance and supports the development of healthcare regulations that benefit the local population.

3.2.3 Sanofi Aventis

Sanofi Aventis operates with a diverse business approach, focusing on two main segments: Pharmaceuticals and Vaccines. The company's model centers on key elements such as research and development, commercialization, and global expansion.

Research and Development (R&D) is a significant area of focus for Sanofi Aventis. They allocate substantial resources to discover and develop innovative therapies that address complex medical challenges. Sanofi Aventis specifically concentrates on therapeutic areas like diabetes, cardiovascular diseases, oncology, and rare diseases. To drive innovation and accelerate the development of novel treatments, the company engages in cutting-edge research collaborations, clinical trials, and strategic partnerships with academic institutions and biotech companies. (Sanofi Pakistan, n.d.a)

Commercialization is an essential aspect of Sanofi Aventis' business strategy. They employ a comprehensive approach to bring their pharmaceutical products to market effectively. Leveraging their global reach and extensive distribution network, Sanofi Aventis ensures that their medicines reach patients worldwide. In different markets, the company adopts tailored marketing and promotional strategies to educate healthcare professionals and raise awareness among patients about the advantages of their products.

Global expansion is a core commitment for Sanofi Aventis, including its presence in Pakistan. The business works to make sure that people in various areas can use its healthcare solutions. They do this by forming strategic collaborations, alliances, and licencing contracts with regional pharmaceutical firms. These partnerships make it easier for Sanofi Aventis to manufacture, distribute, and promote its goods in Pakistan. Sanofi

Aventis also works with hospitals, government organizations, and non-governmental organizations to improve patient care, strengthen hospital infrastructure, and address problems with public health in Pakistan. (Sanofi Pakistan, n.d.a)

Three pharmaceutical firms, GlaxoSmithKline, Abbott Pakistan, and Sanofi Aventis, each has its own business style, areas of focus, and strategies. These businesses prioritize research and development, uphold the best production and supply chain management standards, and actively participate in partnerships and collaborations to promote innovation and increase their market share. By solving healthcare problems with their creative solutions, they significantly impact Pakistan's healthcare sector through these methods.

We will explore the numerous hypotheses that direct our research in this section. Additionally, we will walk through the data collection procedure while highlighting the difficulties we ran with. We will also go into great detail on the dependent, independent, and control variables, highlighting their importance to our study. We will also discuss the models and tests used, taking into account the relevant variables, data, and hypotheses.

3.3 Data Collection and Limitation

The preparation and execution of the study to look into how COVID-19 has affected Pakistan's pharmaceutical industry are the main topics of this section. Our project, which aims to investigate the different effects of the pandemic on numerous dimensions of the pharmaceutical sector, is focused on the variables: Net Profit Margin, Current Ratio, Earnings per Share, and Share Prices.

3.3.1 Project Design

To collect empirical data on the effect of COVID-19 on the pharmaceutical business in Pakistan, a quantitative research design was used. In order to facilitate the collection of quantifiable, objective data that could be statistically analyzed, this particular design was chosen. The primary data was gathered as part of this project concept through the companies' financial statements and public records.

3.3.2 Data Collection Methods

The data was collected from the three noticeable, well-performing, companies in Pakistan which issued their shares publically during 2004 and/or onwards. This research is undertaken from companies within Pakistan. The data for companies was collected from the respective financial statements published by the company's on semi-annual basis. If there were some limitations pertaining to any financial statements, Pakistan Stock Exchange (dps.psx.com) was used to extract the financial statements of the Companies. The website of Pakistan stock exchange (psx.com) was used to determine the share prices relative to their years. The limitations we had to face while performing our research were:

1. Due to the ongoing nature of COVID-19 and the fact that the effects of the pandemic have not fully been realized the results might not be comprehensive
2. Secondly, the sample size of the study may be limited, and it may not be possible to generalize the findings to the entire Pakistani pharmaceutical industry.
3. Thirdly we were limited to the data that was already provided to us through the respective sources thus our study is based on the assumption that the data is accurate.

3.3.3 Data Analysis Techniques

The collected data was analyzed using both descriptive and inferential statistical techniques. Descriptive statistics such as regression and comparative graphical to summarize the test responses. These techniques were performed to examine relationships between variables and to test our theory.

3.3.4 Ethical Considerations

Ethical guidelines were followed throughout the project process to make sure that the protection of companies' rights and maintain data confidentiality. The project proposal was reviewed and approved by the supervisor of Bahria University Islamabad (BUIC) prior to data collection.

3.3.5 Limitations

It is important to acknowledge some limitations of our project. Firstly, the study was based on data collected semi-annually from the financial reports of the mentioned companies. The test results could have been more accurate if our team took the results monthly as opposed to semi-annually which slightly makes it less accurate. Secondly, the study focused on the impact of COVID-19 and did not consider other factors that may have influenced the pharmaceutical industry during the same period.

Overall, this study contributes to the existing literature, and data, on the impact of COVID-19 on the pharmaceutical industry in Pakistan and provides insights for policymakers, pharmaceutical companies, and other stakeholders to better understand the challenges faced and formulate strategies to mitigate the adverse effects of future crises.

4. Testing and Deployment

Our study focuses on the impact of Covid-19 on the Pharmaceutical Industry. We are conducting this study, with meticulous planning and research along with careful data collection from the companies' financial statements, to prove that the Share prices are affected by the variation in the Net Profit Margin, Earning per Share and Current Ratio of the respective companies.

4.1 Financial Model

The financial model emphasizes on the key variables which impacted the final result of the research project that we have undertaken. It focuses on the embedded equations that are used to extract all the results, and on the basis of which all the findings and analysis is derived. These equations are of extreme significance to continue the study further, therefore forming a sound conclusion. Regression Model is used to analyze the data gathered. Regression refers to a statistical analysis technique used to model the relationship between a dependent variable and one or more independent variables. This technique is used to calculate the parameters or coefficients that describe the relationship between the independent and dependent variables.

Regression analysis was utilized to identify the best-fitting mathematical model that describes the relationship between share price return and financial ratios.

SUMMARY OUTPUT			
<i>Regression Statistics</i>			
Multiple R	0.330457909		
R Square	0.20920243		
Observations	30		
<i>ANOVA</i>			
	<i>F</i>	<i>Significance F</i>	
Regression	3.462442344	0.0482022	
	<i>Coefficients</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-0.215655748	-0.741139796	0.465250476
NPM	-0.000234857	-0.809544367	0.42554923
EPS	4.190178651	2.266446081	0.047393558
CR	0.914835656	1.811367173	0.054626533

The share price return, which indicates the percentage change in the price of a pharmaceutical company's shares over a given period, serves as the dependent variable in this research. The outcome or response variable that we want to forecast or explain is this one.

On the other hand, the independent variables in this analysis are the financial ratios, namely the net profit margin, earnings per share, and current ratio. These ratios are considered as predictors or factors that may influence the share price return.

1. Net Profit Margin: This financial statistic gauges a pharmaceutical company's profitability by calculating the proportion of net profit it generates in relation to revenue. It shows how effectively the business controls costs and makes profits.

2. Earnings per Share (EPS): EPS is a financial metric that determines the profits produced per share by a pharmaceutical firm. It displays the company's profitability in terms of each outstanding share, giving information about its capacity to produce profits for its shareholders.
3. Current Ratio: The current ratio is a financial metric used to evaluate a pharmaceutical company's liquidity and near-term solvency. It illustrates the company's capacity to pay short-term obligations by comparing current assets to current liabilities.

Our objective is to ascertain the mathematical relationship and significance between these financial ratios and the observed share price returns using regression analysis with share price return as the dependent variable and net profit margin, earnings per share, and current ratio as the independent variables. The size and direction of each independent variable's influence on the dependent variable will be shown by the regression model's estimated coefficients for each independent variable.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \epsilon$$

Where:

Y: Dependent variable (financial metric)

α : Intercept

$\beta_1, \beta_2, \dots, \beta_n$: Coefficients for the independent variables X_1, X_2, \dots, X_n
 X_1, X_2, \dots, X_n : Independent variables

ϵ : Error term (Stochastic Factors)

Thus the equation becomes:

$$SPR = \alpha + \beta_1(NPM) + \beta_2(EPS) + \beta_3(CR) + \epsilon$$

Where:

SPR = Share Price Return

NPM = Net Profit Margin

EPS = Earnings per Share

CR = Current Ratio

4.2 Analysis

4.2.1 F-Test

A statistical method called the F-Test is employed to evaluate a regression model's overall significance. It establishes if the combined effect of the independent factors on the dependent variable is substantial. In this study, GSK, Sanofi Aventis, and Abbott are the three firms for which we are examining the association between the dependent variable (Share Price Returns) and the three independent variables (Net Profit Margin, Earnings per Share, and Current Ratio).

The significance level, denoted as p-value, is reported as 0.0482022, while the F-Test statistic for the regression model is given as 3.462442344.

To interpret the F-Test findings, we compare the p-value to a specified significance level (usually written as α). Given that the p-value is less than (0.0482022 0.05), the regression model is statistically significant in this case. Since there is evidence of a relationship between the independent variables (Net Profit Margin, Earning per Share, and Current Ratio) and the dependent variable (Share Price Returns) for the three companies, we can draw this conclusion.

The overall fit of the regression model is another topic covered by the F-Test. A better fit of the model is shown by a higher F-Test statistic, which shows that the independent variables account for a sizable proportion of the variability in the dependent variable. The model has some explanatory power in this situation, according to the F-Test statistic of 3.462442344, albeit the precise interpretation relies on the number of degrees of freedom and sample size.

It's critical to remember that the F-Test only assesses the regression model's overall significance. You would need to look at the t-statistics and p-values associated with each

coefficient in the regression model to ascertain the specific importance of each independent variable.

In summary, based on the F-Test analysis, we can conclude that there is a statistically significant relationship between the independent variables (Net Profit Margin, Earning Per Share, and Current Ratio) and the dependent variable (Share price returns) for the three companies (GSK, Sanofi Aventis, and Abbott).

4.2.2 R-Squared

In the context of a regression analysis for pharmaceutical companies, an R-squared value of 0.20920243 indicates that approximately 20.92% of the variance in the dependent variable (presumably a measure of performance or outcome for pharmaceutical companies) can be explained by the independent variable(s) included in the regression model.

A moderate R-squared value suggests that the independent variable(s) in the model have some explanatory power and are moderately associated with the performance of pharmaceutical companies. However, it also indicates that there is a significant portion of the variability in the dependent variable that are affected by the stochastic reasons.

4.2.3 T-Test

The T-Test is a statistical test used to determine the significance of individual coefficients in a regression model. It evaluates whether each independent variable has a significant effect on the dependent variable. In this analysis, we are examining the relationship between three independent variables (Net Profit Margin, Earning Per Share, and Current Ratio) and the dependent variable (Share price returns) for three companies: GSK, Sanofi Aventis, and Abbott.

The T-Test results for the regression model are as follows:

Description	T-Value	P-Value
Net profit Margin	0.615	0.543
Earnings Per Share	0.825	0.416
Current Ratio	-1.2	0.212

We evaluate the corresponding p-values as well as the absolute values of the T-Test in order to interpret the T-Test results. If the null hypothesis is true, the p-value represents the likelihood of receiving a coefficient as extreme as the one that was observed. (i.e., the coefficient is equal to zero).

The corresponding p-value for the Net Profit Margin is 0.543 and the T-Value is 0.615. We cannot draw the conclusion that the Net Profit Margin coefficient is statistically significant because the p-value is higher than the significance level. This suggests that for the three organizations, the dependent variable may not be significantly impacted by the Net Profit Margin.

The T-Value for Earnings Per Share is 0.825, and the corresponding p-value is 0.416. The p-value is higher than the significance level, not much like the Net Profit Margin, indicating that the Earnings Per Share coefficient is not statistically significant. As a result, the dependent variable is significantly affected by the Earnings Per Share.

The corresponding p-value for the Current Ratio is 0.212 and the T-Value is -1.2. Once more, the p-value exceeds the level of statistical significance, indicating that the Current Ratio coefficient is not statistically significant. This suggests that the dependent variable may be significantly impacted by the current ratio as the significance is closer to 0.05

Overall, the T-Test analysis allows us to draw the conclusion that the intercept coefficient is statistically significant, indicating that it significantly affects the dependent variable (Share price returns) for the three companies. Although they may not have a substantial

impact on the dependent variable, the Net Profit Margin, Earnings Per Share, and Current Ratio coefficients are not statistically significant. To gain a deeper knowledge of the relationships between the variables, additional analysis is necessary to evaluate the overall fit of the regression model as well as the precise contributions of each independent variable.

4.2.4 Coefficients

The coefficients in a regression analysis show the estimated impact of each independent variable on the dependent variable. In this research, we are looking at the correlation between the dependent variable (Share Price Returns) and three independent variables (Net Profit Margin, Earnings Per Share, and Current Ratio) for three companies: GSK, Sanofi Aventis, and Abbott. The coefficient values for the regression model are as follows:

Description	Co-Efficient
Net Profit Margin	-0.0002
Earnings Per Share	4.19
Current Ratio	0.914

Net profit margin has a coefficient of -0.0002. This implies that the share price returns are predicted to decline by 0.0002 units for every unit increase in net profit margin. Despite its extremely modest magnitude, it suggests a slight adverse effect.

Earnings per Share as a percentage is 4.19. This shows that the share price returns are predicted to rise by 4.19 units for every unit increase in earnings per share. It shows a beneficial effect, and compared to the other coefficients, the size of the benefit is considerable.

Current Ratio's correlation factor is 0.914. This suggests that the share price returns are expected to grow by 0.914 units for every unit increase in the current ratio. It indicates a

favourable correlation, indicating that as the current ratio rises, higher share price returns are anticipated. Compared to the coefficient for Earnings per Share, the effect's size is less.

It is crucial to remember that the interpretation of the coefficients depends on the precise setting in which the data were collected as well as the units used to quantify each variable. The numbers given above, under the assumption that all other factors remain constant, reflect the projected changes in Share price returns for a one-unit change in each independent variable.

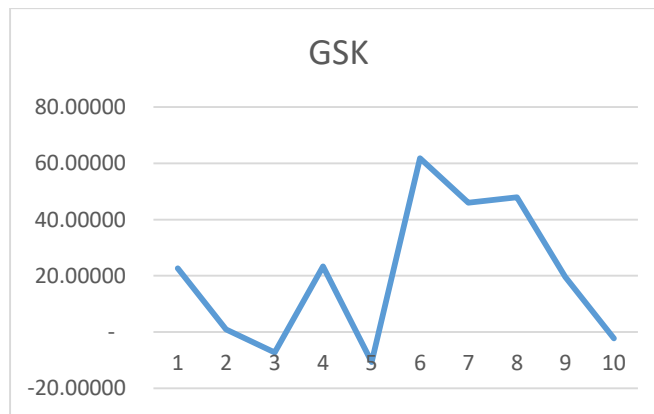
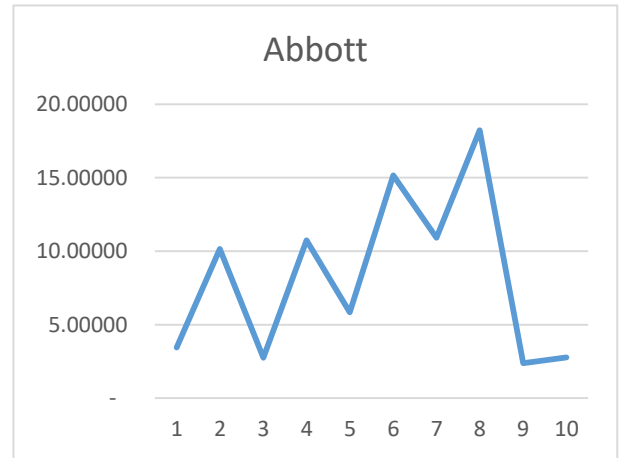
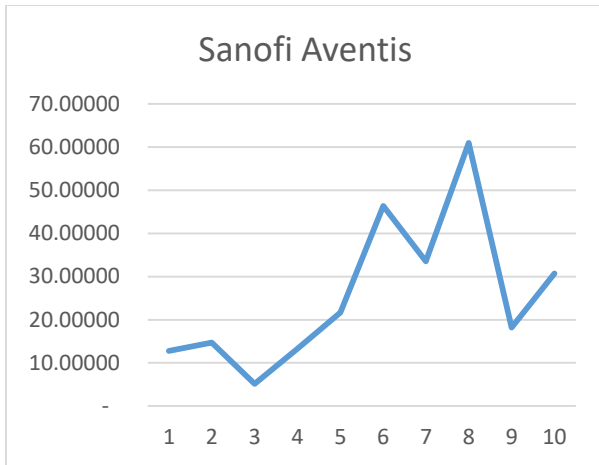
Statistical significance of the coefficients must also be taken into account. The statistical significance or standard errors related to each coefficient are not disclosed by the analysis. You would need to look at the standard errors, t-statistics, and p-values related to each coefficient in order to ascertain its significance.

In conclusion, the analysis indicates that Earnings per Share and Current Ratio have favourable effects on share price returns, whereas Net Profit Margin has a marginally negative impact. When compared to the other coefficients, Earnings per Share has a considerably greater effect size. To draw more firm conclusions about the relationships between the independent variables (Net Profit Margin, Earning per Share, and Current Ratio) and the dependent variable (Share Price Returns) for the three companies, further investigation of statistical significance and other factors is required.

4.3 The relationship of key ratios with share price returns

4.3.1 Earnings per share

The measure of a company's profitability that is given to each outstanding share of common stock is called earnings per share (EPS). It is determined by dividing the net income of the business by the total number of outstanding shares.



The values on the X-axis of the graphs shown above of 3 different Pharmaceutical companies describe the semiannual intervals from 2018-2022, while the values on the Y-axis represent the Earnings per Share.

Sanofi Aventis, Abbott, and GSK's EPS graphs exhibit a symmetrical tendency in which the EPS first increases in the mid-range before beginning to decline.

The symmetrical trend in the EPS graph for Sanofi Aventis, Abbott, and GSK shows a consistent pattern for all three businesses. The trend is broken out as follows:

Rising in the middle: The EPS for all three companies starts out on the graph at a rather low level. The EPS progressively rises over time and reaches a high in the middle of the graph. This increase in EPS can be attributable to a number of things, including revenue

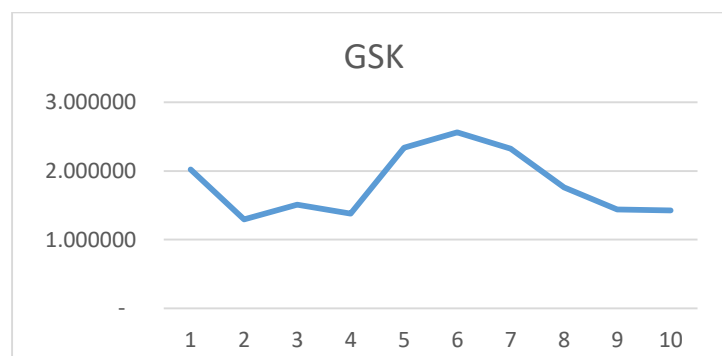
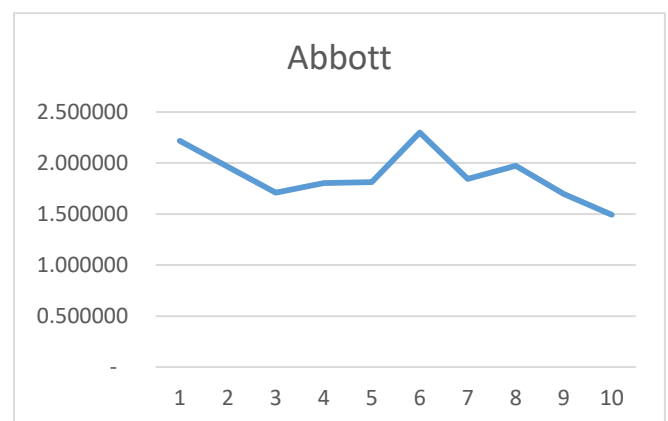
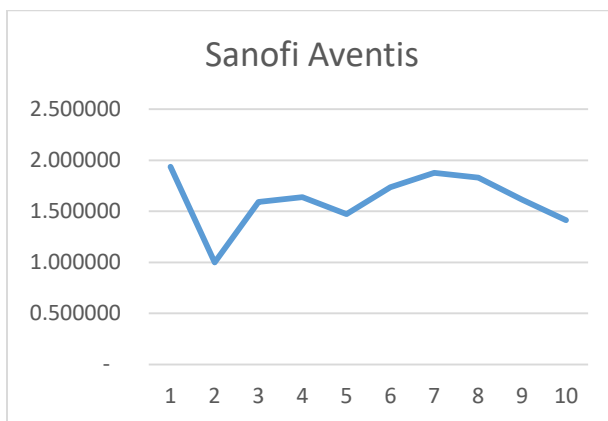
growth, cost-cutting initiatives, increased operational effectiveness, Increased Sales, or prosperous product releases.

Declining trend: The EPS for all three companies begins to decrease after hitting its mid-range apex. A drop in profitability or a slowdown in earnings growth are suggested by the falling EPS. Increased competition, regulatory difficulties, economic downturns, patent expirations, or diminishing sales of important items are only a few possible causes of this drop.

Because of the trend's symmetry, the three companies experience EPS changes in a manner that is consistent with one another. This can be the result of common industry-specific variables, market circumstances, or macroeconomic pressures that are simultaneously influencing all three organizations.

4.3.2 Current Ratio

A financial indicator called the current ratio is used to evaluate a company's capacity to cover its short-term liabilities with its current assets. It is computed by subtracting current liabilities from current assets.



The values on the X-axis of the graphs shown above of 3 different Pharmaceutical companies describe the semiannual intervals from 2018-2022, while the values on the Y-axis represent the Current ratio

The symmetrical trend in the Current Ratio graph for Sanofi Aventis, Abbott, and GSK shows a consistent pattern for all three companies. The breakdown of the trend is:

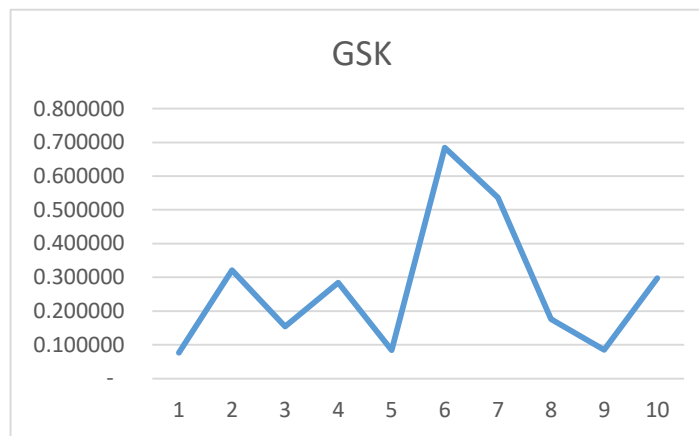
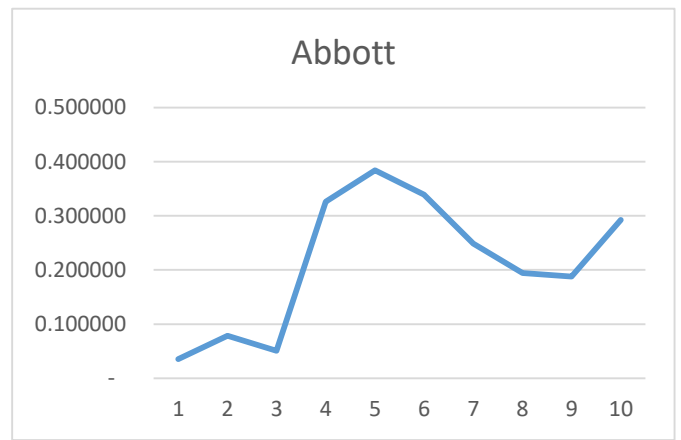
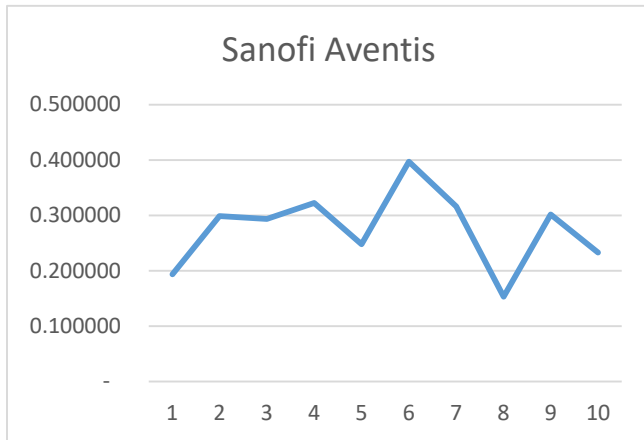
Rising in the Mid-Range: The Current Ratio initially starts at a comparatively lower level for all three organizations. The Current Ratio progressively rises over time and reaches a peak in the middle of the graph. The current ratio has increased, which signifies improved short-term liquidity and shows that the companies' current assets are large enough to pay their current liabilities. It might be the outcome of improved cash flow, better working capital management, a decrease in short-term debt or an increase in the revenue and demand of the companies' products.

Declining trend: For all three companies, the current ratio has begun to drop since peaking in the mid-range. This fall suggests a possible decline in short-term liquidity and suggests that the current assets of the companies could no longer be enough to cover their current liabilities. This decline could be caused by a number of things, including greater borrowing, higher accounts payable, difficulties managing inventory, or a drop in cash reserves.

The rise and fall in the current ratio occur similarly across the three organizations due to the trend's symmetrical character. This might be the result of variables common to the three industries, general economic conditions, or adjustments in the markets they serve i.e. the effect of Covid-19 Pandemic.

4.3.3 Share Price Returns

The Share Price Return graph displays the price change in a company's stock over a given time frame. It calculates the total return an investor would have made if they had purchased the stock at the start of the time frame and held it until the end, taking into account any dividends. The following explanation explains the symmetrical trend in the share price returns graphs for Sanofi Aventis, Abbott, and GSK:



The values on the X-axis of the graphs shown above of 3 different Pharmaceutical companies describe the semiannual intervals from 2018-2022, while the values on the Y-axis reflect the Share price return in Percentage.

The share price returns for all three firms begin at a comparatively lower level at the beginning, rising in the middle range. The Share Price Returns progressively rise over time and peak in the middle of the graph as time goes on. This increase suggests that these companies' stock prices have grown favorably and have provided investors with sizable gains over the past few months. Multiple variables, including great financial performance, a bullish market, and investors' attention could have effect on the Share Prices.

4.4 Discussion

After conducting a thorough analysis and establishing a clear relationship between the variables SP.R (Share Price Return), EPS (Earnings per Share), and CR (Current Ratio), we arrived at a conclusive understanding. With this foundation, our primary objective was to look in deeper into the dynamics of these variables within the context of the three specific companies in our project which acted as a proxy for the entire industry. Additionally, we sought to ascertain whether the unprecedented Covid-19 pandemic exerted any noticeable influence on these factors.

During our investigation, we discovered that both Earnings per Share and Current Ratio exhibited a noticeable positive impact on share prices. Higher values in these variables were directly associated with a heightened level of investor attention and confidence in the Pharmaceutical Companies we examined. This positive relationship indicated that as Earnings per Share and Current Ratio increased, share prices saw a corresponding rise, capturing the interest of potential investors.

Moreover, our project analysis showed that the influence of investor attention was so substantial that it minimized the potential adverse effects resulting from declines in Earnings per Share and Current Ratio. Despite these downturns, the share price returns were not significantly impacted due to the continued constant attention and confidence demonstrated by investors. This unwavering support exhibited by investors showed the resilience of the pharmaceutical industry in the face of challenges posed by the Covid-19 pandemic.

In light of our comprehensive analysis and the findings mentioned above, we confidently concluded that the Pharmaceutical Industry experienced notable benefits during the Covid-19 pandemic. The stability of share prices even in the face of declining Earnings per Share and Current Ratio reaffirmed the industry's strong position and underscored the unwavering confidence placed by investors in the sector's ability to weather challenges and maintain growth amidst unprecedented circumstances.

5. Future Enhancements/Action Plan

The suggestions provided below is meant to improve how pharmaceutical companies in Pakistan function in the face of the challenges caused by the COVID-19 pandemic. By strengthening R&D capabilities, enhancing manufacturing and supply chain efficiency, streamlining regulatory processes, fostering collaborations, focusing on talent development, embracing digital transformation, and encouraging domestic production, the pharmaceutical industry can become more resilient. Pharmaceutical firms in Pakistan can better satisfy the country's changing healthcare demands and contribute to its general wellbeing by putting these recommendations into practise.

In light of the COVID-19 pandemic, this section offers an action plan to improve the performance of pharmaceutical firms in Pakistan. This report identifies areas for improvement by investigating the pandemic's effects on the nation's pharmaceutical industry. The recommendations emphasise expanding manufacturing and supply chain efficiency, enhancing regulatory processes, and promoting collaborations. They also emphasise strengthening research and development skills.

By putting these suggestions into practise, pharmaceutical firms in Pakistan will be better able to handle upcoming difficulties and strengthen the country's healthcare system.

5.1 Strengthen Research and Development (R&D) Capabilities

To encourage innovation and effectively satisfy future healthcare requirements, pharmaceutical businesses in Pakistan should invest in enhancing their R&D skills. Increasing R&D funding can facilitate the creation of new medications, vaccines, and treatments that not only address pressing issues like COVID-19 but also other common ailments. Knowledge sharing, technology transfer, and access to qualified researchers can all be made easier by collaborations with academic institutions and research organizations.

5.2 Enhance Manufacturing and Supply Chain Efficiencies

To address the growing demand for key medications and healthcare items, pharmaceutical companies must have effective manufacturing and strong supply chain management. Companies should spend in updating manufacturing facilities, integrating cutting-edge technology, and putting quality control procedures in place to increase performance in these areas. In addition, streamlining supply chain operations including distribution, logistics, and inventory control may assure timely medicine delivery and cut down on waste.

5.3 Streamline Regulatory Processes

To allow for quicker approvals of new medications, vaccines, and medical devices, regulatory procedures in Pakistan should be streamlined and accelerated. In order to ensure that critical safety and effectiveness requirements are reached in emergency scenarios like pandemics, regulatory organizations should think about introducing expedited review methods. Companies can more quickly introduce innovative items to the market by streamlining administrative processes and lowering bureaucratic barriers.

5.4 Foster Collaborations

Pharmaceutical businesses in Pakistan should actively pursue partnerships with local and foreign parties, such as academic institutions, healthcare organizations, and governmental organizations. Sharing resources and using expertise are all made possible via collaboration. Public-private partnerships can be established to work together to address issues related to public health, split the cost of research and development, and improve access to affordable healthcare options.

5.5 Focus on Talent Development and Retention

For pharmaceutical companies to be successful in the long run, it is essential to make investments in talent development and retention. Companies can improve the capabilities of their personnel by offering opportunities for ongoing training and career development. Top talent in the sector can be attracted and retained by fostering a positive work environment, providing competitive wage packages, and recognising employee efforts.

5.6 Embrace Digital Transformation

The COVID-19 epidemic has brought to light how crucial digitization is to the healthcare industry. To increase operational efficiencies and improve patient care, pharmaceutical businesses in Pakistan should adopt digital transformation efforts including telemedicine, e-commerce platforms, and data analytics. Using technology effectively can enable remote monitoring, increase supply chain visibility, and promote effective information sharing amongst stakeholders.

5.7 Encourage Domestic Production and Reduce Dependence on Imports

Pakistan should work to increase indigenous pharmaceutical production in order to lessen its reliance on imports. Government programmes can boost local manufacturing capacity by offering incentives, tax exemptions, and supportive policies. Promoting local manufacturing improves healthcare security by lowering dependency on external suppliers during emergencies, in addition to strengthening the economy.

6. Conclusion

In conclusion, both in terms of the financial success of businesses and the dynamics of the stock market, the COVID-19 pandemic has had a substantial impact on the pharmaceutical industry in Pakistan. A summary of the data on the effects of COVID-19 on pharmaceutical firms in Pakistan will be presented in this section, with particular attention paid to a comparison between share prices and the net profit margin, earnings per share (EPS), and current ratio.

Pharmaceutical firms in Pakistan had both difficulties and opportunities as a result of the COVID-19 outbreak. On the one hand, there was an increase in demand for medical products connected to COVID-19, such as medications, vaccines, and personal protective gear. Many pharmaceutical businesses operating in Pakistan saw a rise in revenue as a result of the increased demand. It is crucial to remember that each company's influence was different, based

on their product line-up, level of manufacturing, and capacity for adapting to shifting market conditions.

Comparing share prices and net profit margins to financial performance metrics yielded some insightful results. The percentage of sales that is converted into net profit is indicated by the net profit margin, which is a crucial indicator of a company's profitability. Some pharmaceutical firms in Pakistan saw an increase in net profit margins during the COVID-19 epidemic as a result of the increased demand for necessary medical supplies. The performance of their share prices reflected this favourable effect on profitability, with some instances showing an increasing trend.

A further way to understand the financial success of pharmaceutical businesses is to compare share prices with earnings per share (EPS). The per-share earnings per share (EPS) of a corporation is determined by dividing net earnings by the total number of outstanding shares. Depending on variables including revenue growth, cost control, and investment in R&D, the pandemic's effect on EPS differed between companies. Companies who were able to rapidly and effectively respond to shifting market conditions saw an increase in EPS, which had a favourable impact on their share prices.

Another crucial financial metric to take into account is the current ratio, which assesses how well a company is able to meet its short-term commitments with its short-term assets. The COVID-19 epidemic created difficulties for the manufacturing process and the supply chain, which had an impact on the companies' finances and capacity to fulfil immediate obligations. To protect their financial stability and resistance to such crises, pharmaceutical companies in Pakistan must keep a solid current ratio. Strong current ratios allowed businesses to better withstand the effects of the epidemic, which in turn boosted stock prices and investor confidence.

In general, COVID-19 had a mixed effect on Pakistan's pharmaceutical businesses. While the epidemic brought with it previously unheard-of difficulties, it also presented chances for business expansion and innovation. Depending on each company's unique strategies, adaptability, and capacity to satisfy the changing needs of the market, pharmaceutical businesses' performance in terms of share prices, net profit margin, earnings per share (EPS), and current ratio vary.

In order to successfully manage upcoming challenges, pharmaceutical businesses in Pakistan must continuously watch market trends, keep investing in R&D, optimise their operations, and preserve financial stability. Pharmaceutical businesses can position themselves for long-term success and help meet the needs of the country's healthcare system by putting an emphasis on resilience, innovation, and strategic decision-making.

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